古代英語以前の子音推移

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A Reformalization of Pre-O.E. Consonantal Shifts

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生成音韻論は共時的な面で多くの貢献をなしつつあるが，これを通時的な面に適用した結果次の事が判明した。

(1) 印欧基語から古代英語に至る各段階で起った変化の多くは，決して一度限りのものではなく，多少その形を変えるだけで何度もくり返し行われた。

(2) この期間に起った変化のあるものは，以前に起った変化の全部または一部の解除としてとらえることができる。

(3) 各段階において音素に余剰的な特徴を与える共時的規則は，時代が移り音素組織に変化がおこってもほとんど本質的な変化を受けない。

(4) 共時的な面での記述と同様，生成音韻論の方法を使うことにより，従来のいわゆる音素を基礎にした方法よりはるかに一般的な記述が可能になる。

1. Methodological Introduction

Generative phonology, which is an offspring of Jakobsonian theory of distinctive features and Chomskiean transformational generative grammar, has changed the notion of 'phoneme'. At least to generative phonologists, it is no longer 'a minimum unit of distinct sound feature' (Bloomfield, 1933, p. 79), but 'a complex of properties' (Halle, 1962, p. 336) or 'a bundle of features'. Generative phonologists have even discontinued the use of the term 'phoneme' recently, and have replaced it with a more abstract unit, 'segment' (private conversation with Halle; also see Halle, 1962, p. 336; Chomsky, 1964, p. 66; etc.), which may alter some or all of its component features (e. g., the /t/ in *letter* and *latter* becomes [−tense] in General American; also the /k/ in *key* has a feature [−back] while the /k/ in *coo* has a feature [+back]) or which may even be deleted (e. g., /o/ in *territory* in R. P.: cf. *territorial*) by the influence of the context. In the field of synchronic linguistics this

new notion of phonological segment has made it possible to make a more general account of phonological phenomena than was possible with the traditional theory that a phoneme is a set of allophones which cannot be analyzed any further (see, e. g., Halle, 1959; and Chomsky and Halle, forthcoming). In the light of the recent theory of generative phonology, therefore, we attempt in this paper to reformalize the major consonantal shifts which took place during the period between Proto-Indo-European and early West Saxon (c. 700) in the hope that we may also discover some general principles underlying diachronic sound changes.

A set of 'cavity features' developed in Chomsky and Halle (forthcoming)[1] will be used to define each sound. This does not mean, however, that the point and the manner of articulation of each sound have been ascertained exactly as described. What we intend to do in this paper is not to 'reconstruct' actual sounds, but to formulate plausible schemata to explain the nature of sound changes. The immediate objective of modern comparative and historical linguistics is not to reconstruct an actual language spoken in a certain period by a certain group of people at a certain spot on the globe. It is, at least for the time being, utterly impossible. Some features may be traceable up to a certain period (A) by comparative method, some other features may be traceable up to a certain later period (B), and still others only up to a certain much later period (C). Then what we have reconstructed is a mixture of features that existed in three different periods, A, B, and C; except in very lucky cases there is no way of ascertaining how many different periods a reconstructed form represents. What a comparative linguist can do, therefore, and what he is actually doing, is to formulate a set of abstract schemata that would systematically explain the relationship of two or more cognate languages and their respective developments after they were split from each other.

In addition to the cavity features, Halle has recently introduced the theory of 'marking conventions' (his lectures at M.I.T. in spring, 1967, and his forum lecture at the Linguistic Institute at the University of Michigan in the summer of 1967). According to this theory, most of the features in a chart like Table 1 in section **2.1.** are specified either 'marked' or 'unmarked' instead of +, −, or a blank, and then the actual + or − value is assigned to the features of each segment by a set of 'marking conventions'. However, in the light of recent findings in Indo-Eruopean comparative linguistics, there seems to be some room for

1 Halle has recently discontinued the use of Jakobsonian distinctive features which are based largely on acoustics, because it has been ascertained that the acoustic nature of each feature varies substantially with the context. See in this connection Cooper et al. (1952), Schatz (1954), and Danes and Pinson (1963, pp. 124 ff.).

revision of its details. It is especially so in respect to vowels. According to Halle's theory, the marking cost of /a/ is zero, that of /i/ or /u/ is 1, and the cost of /e/ or /o/ is 2. Therefore, says Halle, if a language has only one vowel, it must be /a/; if there are three vowels, they must be /a/, /i/, and /u/. It is, however, almost an established theory that PIE had three short vowels, *e, a, o*,[2] and their long counterparts (see, e.g., Meillet and Vendryes, 1963, p. 38). Some laryngealists (e.g., Benveniste, 1935) even assume that all PIE roots were of the form *CeC* (with many restrictions on the first and the second *C*'s), from which *a*- and *e*-vocalisms were derived under the influence of accent and/or adjacent 'laryngeal', and that *i*- and *u*-vocalisms were derived according to the complex relations of the resonants, laryngeals, and vowels (for details, see Lehmann, 1952, and Winter, 1965). Detailed discussion on this subject and a suggestion for a revision of Halle's theory of 'marking conventions' will be attempted at anothar opportunity. On account of limited space, we will use here the traditional convention of generative phonology, despite its theoretical weakness.

As for the data of actual sound changes, we owe most of them to Campbell (1959), Moore and Knott (1961), Krahe (1963), and Lehnert (1965), though not specifically mentioned in each case. Krahe (1966) was also helpful in supplementing the data on Proto-Into-European and Proto-Germanic sounds. Attempts to reformalize phonological problems in IE, Germanic, and its dialects without a knowledge of previous scholarship are useless; however, a list of all materials consulted in each case would be unduly cumbersome.

2. Proto-Indo-European to Proto-Germanic

2.1. PIE Consonants

The development of laryngeal theory has aroused animated controversy as to the number and the nature of consonants in PIE, nor has this controversy reached a final settlement (see, e.g., Lehmann, 1952, and Winter, 1965). However, the space allotted to this paper is not sufficient to discuss this complicated problem in detail. We will, therefore, temporarily disregard all such disputes and adopt the classical solution of Brugmann (1897—1916), which is fully sufficient in accounting for the series of consonantal shifts which occurred between late PIE and early WS.

Listed in Table 1 are the late PIE consonants we are going to take up in this paper. In addition to these 24 consonants, Brugmann gives 4 labialized velar obstruents ($q,^{w}$ $q,^{wh}$ $g,^{w}$

2 Some people add a schwa ə to them.

g^{wh}). They are not included in Table 1 because they were either split to a velar consonant plus *w* or lost the labial feature in the early period of Gmc, the velar part becoming identical with the offsprings of original unlabialized velar obstruents.

	p	p^h	b	b^h	t	t^h	d	d^h	$\hat{k}$	$\hat{k}^h$	$\hat{g}$	$\hat{g}^h$	q	q^h	g	g^h	s	m	n	ŋ	l	r	w	y
voc	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	+	+	−	−
cns	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	−	−
son																								
cnt	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	+	+	+	+	+	−		
nsl																	−	+	+	+				
cor	−	−	−	−	+	+	+	+	−	−	−	−	−	−	−	−		−	+	−				
ant	+	+	+	+					−	−	−	−	−	−	−	−		+		−				
bck									−	−	−	−	+	+	+	+							+	−
tns	−	+	−	+	−	+	−	+	−	+	−	+	−	+	−	+								
vcd	−	−	+	+	−	−	+	+	−	−	+	+	−	−	+	+								
str																								

Table 1[3]

The features not specified in Table 1 are filled in by the following set of synchronic rules:[4]

(1) $\begin{bmatrix} \alpha\ \text{voc} \\ \alpha\ \text{cns} \end{bmatrix} \longrightarrow \begin{pmatrix} +\text{son} \\ -\text{nsl} \\ \alpha\ \text{cor} \\ \alpha\ \text{ant} \end{pmatrix}$

(2) $\begin{bmatrix} -\text{voc} \\ -\text{cns} \end{bmatrix} \longrightarrow [\ +\text{cnt}\ ]$

(3) $\begin{bmatrix} -\text{voc} \\ -\text{cnt} \end{bmatrix} \longrightarrow \begin{bmatrix} -\text{son} \\ -\text{nsl} \end{bmatrix}$

(4) $[\quad] \longrightarrow [\ -\text{str}\ ]$[5]

(5) $\begin{pmatrix} -\text{voc} \\ +\text{cns} \\ +\text{cnt} \\ -\text{nsl} \end{pmatrix} \longrightarrow \begin{pmatrix} -\text{son} \\ +\text{cor} \\ +\text{tns} \\ -\text{vcd} \\ +\text{str} \end{pmatrix}^5$

3 voc=vocalic, cns=consonantal, son=sonorant, cnt=continuant, nsl=nasal, cor=coronal, ant=anterior, bck=back, tns=tense, vcd=voiced, str=strident. ŋ was not a 'phoneme' but an 'allophone' of /n/ if we use the traditional terminology. For practical purposes, however, we treat it independently, for the sound change is, in a sense, more dependent on the phonetic nature of related sounds than their phonemic nature. *g* and *γ* in PGmc, WGmc, and OE are also in complementary distribution, but they will be treated separately for the same reason.

4 In this paper, ⟶ is used in synchronic rules, and > is used in diachronic rules, both in the sens, 'rewrite as'.

(6) [+nas] $\longrightarrow \begin{bmatrix} +\text{son} \\ +\text{bck} \end{bmatrix}$[6]

(7) [+cor] $\longrightarrow$ [+ant]

(8) [+ant] $\longrightarrow$ [−bck]

(9) [+son] $\longrightarrow \begin{bmatrix} -\text{tns} \\ +\text{vcd} \end{bmatrix}$

2. 2. Changes

2. 2. 1. First Consonantal Shift (Grimm's Law)

There is the following set of correspondence between the IE stops and the Gmc counterparts:

IE	Gmc	IE	Gmc	IE	Gmc
p, p^h	$> f$	b	$> p$	b^h	$> b$
t, t^h	$> \theta$	d	$> t$	d^h	$> d$
$\hat{k}, \hat{k}^h$ q, q^h	$> x$	$\hat{g}, g$	$> k$	$\hat{g}^h, g^h$	$> g$

This set of correspondence, known generally as 'Grimm's law', is so commonly known that no example needs be cited here. Grimm's law may be formalized by the rules (8_1), (10), (11), (12), and (13), applied in the given order:

(8_1) $\begin{bmatrix} +\text{cns} \\ \alpha\ \text{ant} \end{bmatrix} >$ [$-\alpha$ bck]

By this rule, the palatal stops ($\hat{k}, \hat{k}^h \hat{g}, \hat{g}^h$) and the velar stops ($q, q^h g, g^h$) are fused into a single series ($k, k^h g, g^h$). Note that rule (8_1) is a partial generalization of an IE synchronic rule (8).

(10) $\begin{bmatrix} -\text{cnt} \\ -\text{vcd} \end{bmatrix} >$ [+tns]/[+son]——

(i. e., $\begin{Bmatrix} p, & t, & k \\ p^h, & t^h, & k^h \end{Bmatrix} > p^h, t^h, k^h$)

We add the environmental restriction, [+son]——, to rule (10) because if the unaspirated voiceless stop (p, t, k) was preceded by another stop or s, it remained unchanged, e. g.:

Lat *spuere*≈Goth *speiwan*,[7] OS, OGH *spīwan*, OE *spīwan*, *speowan*, 'spew'.

Lat *hostis*≈Goth *gastis*, OIsl *gestr*, OS, OHG *gast*, OE *giest*, 'guest'.

Lat *piscis*≈ Goth *fisks*, OE *fisc*, 'fish'.

Lat *octō*≈Goth *ahtau*, OHG, OS *ahto*, OFris *ahta*, OE *eahta*, 'eight'.

Lat *neptis*≈OHG, OFris, OE *nift*, 'niece'.

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5 The stridency is marked here so that θ/s and δ/z may be distinguished after Grimm's law and Verner's law have been applied.

6 m and n are not [+back], but [−back]; this adjustment is made by rule (8).

7 We spell all words according to the traditional authography of the particular languages. In Gothic, *ai*=[æ], *ai*=[ɛ:], *ái*=[ai], *aú*=[ɔ], *au*=[ɔ:], *áu*=[au], *ei*=[i:], *iu*=[yu]; all single vowel letters in Gothic, *a, i, u, ā, ē, ō, ū*, are pronounced as in Latin.

(11) $\begin{bmatrix}-\text{son}\\-\text{tns}\end{bmatrix} > [-\text{vcd}]$

(i. e., *b, d, g* > *p, t, k*)

(12) [+tns] > [+cnt]

(i. e., $p^h, t^h, k^h, b^h, d^h, g^h > f, \theta, x, \beta, \eth, \gamma$)

(13) $\begin{bmatrix}-\text{son}\\+\text{vcd}\end{bmatrix} > [-\text{cnt}]$

(i. e., $\beta, \eth, \gamma >$ *b, d, g*)

2. 2. 2. Verner's Law

Verner (1876) says that after the first consonantal shift, 'Germanic still had the free IE accent.'[8] And before all main accents were shifted to the root syllable in Gmc, 'these voiceless fricatives resulted [from Grimm's law] and the voiceless fricative *s* inherited from IE were voiced in medial voiced environment except when they were at the end of accented syllables [i. e., when they were immediately preceded by the vowel with main word accent]; in the latter case, they remained unvoiced.'[9]

These statements are formalized as follows:

(14) [+cnt] > [+vcd]/[−main accent]——

(i. e., *f, θ, x, s*>$\beta, \eth, \gamma, z$)

After rule (14) is applied, the main word accent moves to the root syllable, and rule (15) is applied to make the feature [α tns] redundant.

(15) $\begin{bmatrix}-\text{son}\\\alpha\ \text{vcd}\end{bmatrix} > [-\alpha\ \text{tns}]$

2. 2. 3. It is generally assumed that in Gmc, [g] existed only in the cluster /ŋg/, and that in all other environments it was pronounced [γ]: i. e., [g] and [γ] were in complementary distribution. We will treat these sounds separately for convenience' sake, though they are allophones of the same 'phoneme' (we are not carrying on a phonemic description here, but are trying to formalize sound changes—see p. 152, n. 3). Thus:

(13′) $\begin{pmatrix}-\text{son}\\-\text{cor}\\-\text{ant}\\-\text{tns}\end{pmatrix} > [+\text{cnt}]/\left\{\begin{matrix}\#\\[-\text{nsl}]\end{matrix}\right\}$——

This rule is a partial cancellation of the last rule of Grimm's law (13), and should be ap-

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8 'Das germanische hatte noch nach dem eintreten der lautverschiebung den freien indogermanischen accent.' (*Ibid.*, p. 130)

9 '…die so entstandenen tonlosen fricativae nebst der vom indogermanischen ererbten tonlosen fricativa *s* wurden weiter inlautend bei tönender nachbarschaft selbst tönend, erhielten sich aber als tonlose im nachlaute betonter silben.' (*Ibid.*, p. 114)

plied before (13_1) which is to be developed in **2. 2. 4.**

2. 2. 4. In PGmc, the initial *β* or *β* preceded by *m* became *b*, as in:

Skr *bhrātar* (Lat *frāter*) ≈ Goth *brōþar*, OE *brōþor*, 'brother'; IE **bhendh*— (Skr *bándhati* 'binds') ≈ Goth, OS, OE *bindan*, 'bind'; also see Goth, ON, OFris, OS, OHG, OE *lamb*, 'lamb'.

Also ð > *d* in initial position or after *n*, as in:

IE **dhughəter-*, **dhukter-*, Skr *duhitar-*, Lit *duktẽ* ≈ Goth *dauhtar*, OE *dohtor* 'daughter'.—Also see IE **bhendh-* > Goth, etc. *bindan* as cited above.

Moreover, *γ* > *g* after ŋ, as in:

Goth *aggwus*, ON *ongr*, OS, OHG *engi*, OE *enge* (ModHG *enge*), 'narrow'. Thus:

$$(13_1)\ \begin{bmatrix} -\text{son} \\ \alpha\ \text{cor} \\ \beta\ \text{ant} \\ -\text{str} \\ +\text{vcd} \end{bmatrix} > [-\text{cnt}] / \left\{ \begin{matrix} \# \\ \begin{bmatrix} +\text{nsl} \\ \alpha\ \text{cor} \\ \beta\ \text{ant} \end{bmatrix} \end{matrix} \right\} \text{——}$$

Note that (13_1) is a repetition of the last rule of Grimm's law (13) with environmental restrictions.

2. 3. PGmc Synchronic Rules

The *f*, *x*, and *γ* generated by rules (12) and (14) seem to have been strident. Thus we have the following PGmc synchronic rule to complete Table 2:

$$(16)\ \left\{ \begin{matrix} \begin{bmatrix} -\text{son} \\ +\text{cnt} \\ +\text{bck} \end{bmatrix} \\ \begin{bmatrix} -\text{son} \\ +\text{cnt} \\ -\text{cor} \\ +\text{ant} \\ +\text{tns} \end{bmatrix} \end{matrix} \right\} \longrightarrow [+\text{str}]$$

Rule (16) must be ordered after (13_1).

3. Proto-Germanic to West Germanic

3. 1. As a result of the series of sound changes mentioned in **2.**, there developed the following Proto-Germanic consonants:

	p	b	t	d	k	g	f	β	θ	ð	x	γ	s	z	m	n	ŋ	l	r	w	y
voc	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	+	+	−	−
cns	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	−	−
son	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(+)	(+)	(+)	(+)	(+)	(+)	(+)
cnt	−	−	−	−	−	−	+	+	+	+	+	+	+	+	+	+	+	+	−	(+)	(+)
nsl	(−)	(−)	(−)	(−)	(−)	(−)	−	−	−	−	−	−	−	−	+	+	+	(−)	(−)	(−)	(−)
cor	−	−	+	+	−	−	−	−	+	+	−	−	+	+	−	+	−	(+)	(+)	(−)	(−)
ant	+	+	(+)	(+)	−	−	+	+	(+)	(+)	−	−	(+)	(+)	+	(+)	−	(+)	(+)	(−)	(−)
bck	(−)	(−)	(−)	(−)	(+)	(+)	(−)	(−)	(−)	(−)	(+)	(+)	(−)	(−)	(−)	(−)	(+)	(−)	(−)	+	−
tns	+	−	+	−	+	−	+	−	+	−	+	−	+	−	(−)	(−)	(−)	(−)	(−)	(−)	(−)
vcd	(−)	(+)	(−)	(+)	(−)	(+)	(−)	(+)	(−)	(+)	(−)	(+)	(−)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)
str	(−)	(−)	(−)	(−)	(−)	(−)	(+)	(−)	−	−	(+)	(+)	+	+	(−)	(−)	(−)	(−)	(−)	(−)	(−)

Table 2

All features in Table 2 are already specified by the rules given in chapter 2, though those put in parentheses are redundant. Should we start from this chart, these redundant features are filled in by the following set of synchronic rules:

(1) $\begin{bmatrix} \alpha\,\text{voc} \\ \alpha\,\text{cns} \end{bmatrix} \longrightarrow \begin{pmatrix} +\text{son} \\ -\text{nsl} \\ \alpha\,\text{cor} \\ \alpha\,\text{ant} \end{pmatrix}$ (Same as IE synchronic rule (1))

(2) $\begin{bmatrix} -\text{voc} \\ -\text{cns} \end{bmatrix} \longrightarrow [+\text{cnt}]$ (Same as IE synchronic rule)

(3) $\begin{bmatrix} -\text{voc} \\ -\text{cnt} \end{bmatrix} \longrightarrow \begin{bmatrix} -\text{son} \\ -\text{nsl} \end{bmatrix}$ (Same as IE synchronic rule)

(17) $\begin{pmatrix} -\text{voc} \\ +\text{cns} \\ +\text{cnt} \\ \alpha\,\text{nsl} \end{pmatrix} \longrightarrow [\alpha\,\text{son}]$ (A new synchronic rule)

(7) $[+\text{cor}] \longrightarrow [+\text{ant}]$ (Same as IE synchronic rule)

(8_1) $\begin{bmatrix} +\text{cns} \\ \alpha\,\text{ant} \end{bmatrix} \longrightarrow [-\alpha\,\text{bck}]$

Note that (8_1) is a partly generalized form of PIE synchronic rule (8).

(9_1) $[+\text{son}] \longrightarrow \begin{bmatrix} -\text{tns} \\ -\text{str} \end{bmatrix}$

Note that (9_1) is a partial repetition of PIE synchronic rule (9).

(11_1) $[\alpha\,\text{tns}] \longrightarrow [-\alpha\,\text{vcd}]$

This rule is a generalized form of the second rule of the 'first consonantal shift' (or Grimm's law).

(18) $[-\text{cnt}] \longrightarrow [-\text{str}]$

$$(16_1)\ \begin{pmatrix} -\text{son} \\ +\text{cnt} \\ +\text{bck} \end{pmatrix} \longrightarrow [+\text{str}]$$

$$(16_2)\ \begin{pmatrix} -\text{son} \\ +\text{cnt} \\ -\text{cor} \\ +\text{ant} \\ \alpha\ \text{tns} \end{pmatrix} \longrightarrow [\alpha\ \text{str}]$$

Note that (16_1) is the first half of rule (16) and that (16_2) is a generalized form of the second half of (16) (see **2.3.**).

3.2. Changes

3.2.1. *z*>*r*, e.g.:

IE **maizo*, Goth *maiza*≈OHG, OS *mēro*, OFris, OE *māra*, 'more'; IE **dheu̯só-*, Gmc **deuza*, Goth *dius* (gen. *diuzis*)≈OHG, OS *tior*, OFris *diar*, OE *deor*, 'deer'. Thus:

$$(19)\ \begin{pmatrix} +\text{cor} \\ -\text{tns} \\ +\text{str} \end{pmatrix} > \begin{pmatrix} +\text{voc} \\ +\text{son} \\ -\text{cnt} \\ -\text{str} \end{pmatrix}$$

If we apply the synchronic rules (1) and (9_1) again after (19), then the features [+son] and [−str] in the output of (19) become redundant.

3.2.2. ð>*d*, e.g.:

Gmc **faðǣr* (Skr *pitár-*, Gk *patér-*)≈OHG *fater* (*d*>*t*), OS *fadar*, OFris *feder*, OE *fæder*, 'father'.

Thus:

$$(13_2)\ \begin{pmatrix} -\text{son} \\ +\text{cor} \\ +\text{vcd} \end{pmatrix} > [-\text{cnt}]$$

Note that this is again a repetition of the last rule of Grimm's law (13) with a restriction.

3.2.3. WGmc Gemination before *y*

The gemination occurred to all consonants except *r*, e.g.:

Goth *satjan*≈OHG *sezzan*, OS *settian*, OFris *setta*, OE *settan*, 'set'; Goth *haljan* ≈OHG *hella*, OS *hellia*, OFris *helle*, OE *hell*, 'hell'.—But Gmc **hazjan*>WGmc **harjan*>OE **hærjan*>*herian*, 'praise, commend'; Goth *nasjan*≈OHG *nerian*, OFris *nera*, OS, OE *nerian* (ModHG *nähren*), 'save, rescue', where the gemination did not occur because the consonant bejore *y*, though originally *z* (<*s*), had already been changed to *r* by rule (19) in **3.2.1.**

Thus:

$$(20)\quad \varnothing > \begin{bmatrix} C \\ \alpha\ F \end{bmatrix} / \begin{pmatrix} +voc \\ -cns \\ -tns \end{pmatrix} \begin{bmatrix} C \\ \alpha\ F \end{bmatrix} \text{ —— } \begin{pmatrix} -voc \\ -cns \\ -bck \end{pmatrix}$$

where $\begin{bmatrix} C \\ \alpha\ F \end{bmatrix}$ = any segment other than $\begin{bmatrix} +voc \\ -cns \end{bmatrix}$ or $\begin{pmatrix} +voc \\ +cns \\ -cnt \end{pmatrix}$.

The first term of the environmental restriction in (20) is given because this rule does not apply if the C is preceded by any segment except a short vowel. See, e. g.:

Goth *dōmjan*≈OHG *tuomen*, OS *dōmian*, OE *dēman*, 'deem'.

3. 2. 4. If the geminated consonant is either *β* or *γ*, then it was changed to *b* or *g*, as in:

Gmc **larjan* > OE *lecgan*, 'lay'; Gmc **haβjan* > OE *hebban*, 'heave, lift'.

Thus:

$$(13_3)\quad \begin{pmatrix} -son \\ \alpha\ ant \\ +vcd \end{pmatrix} > [-cnt] / \left\{ \begin{pmatrix} \begin{pmatrix} -son \\ \alpha\ ant \\ +vcd \end{pmatrix} \text{ ——} \end{pmatrix}, \begin{pmatrix} \text{——} \begin{pmatrix} -son \\ \alpha\ ant \\ +vcd \end{pmatrix} \end{pmatrix} \right\}$$

Note that this is another repetition of the last rule of Grimm's law with environmental restrictions. Before this rule, all ð had already been changed to *d* by (13_2) in 3.2.2., thus the feature [−cor] need not be put in the input and the environments of rule (13_3).

3. 2. 5. *p*, *t*, *k* were also geminated before *r* or *l*, as in:

Goth *baitrs*≈OHG, OS *bittar*, OE *biter*, *bitter*, 'bitter' (after gen. *bittres*, etc.);

Goth **aplus*≈OS OFris *appel*, OE æ*pl*, æ*ppel*, 'apple'.

Thus:

$$(20_1)\quad \varnothing > \begin{pmatrix} -cnt \\ +tns \\ \alpha\ F \end{pmatrix} / V \begin{pmatrix} -cnt \\ +tns \\ \alpha\ F \end{pmatrix} \text{ —— } \begin{bmatrix} +voc \\ +cns \end{bmatrix}$$

4. West Germanic to Old English (West Saxon)

4. 1. As a result of the series of changes mentioned in the preceding chapter, ð and *z* disappeared and the WGmc consonant system became as listed in Table 3:

All features in Table 3 are already specified by the rules given in chapter 3, though those put in parentheses are redundant. Should we start from this chart, these redundant features are filled in by the following set of synchronic rules applied in the given order:

(1)-(2)-(3)-(17)-(7)-(8_1)-(9_1)-(21)-(11_1)-(18)-(16_1)-(16_2).

Note that the rules and their order of application are exactly the same as PGmc except that the WGmc synchronic rule (21) is inserted between (9_1) and (11_1). This newly in-

serted rule is given below:

$$(21)\ \begin{pmatrix} -\text{son} \\ +\text{cnt} \\ +\text{ant} \end{pmatrix} \longrightarrow [+\text{tns}]$$

	p	b	t	d	k	g	f	β	θ	x	γ	s	m	n	ŋ	l	r	w	y
voc	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	+	+	−	−
cns	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	−	−
son	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(+)	(+)	(+)	(+)	(+)	(+)	(+)
cnt	−	−	−	−	−	−	+	+	+	+	+	+	+	+	+	+	−	(+)	(+)
nsl	(−)	(−)	(−)	(−)	(−)	(−)	−	−	−	−	−	−	+	+	+	(−)	(−)	(−)	(−)
cor	−	−	+	+	−	−	−	−	+	−	−	+	−	+	−	(+)	(+)	(−)	(−)
ant	+	+	(+)	(+)	−	−	+	+	(+)	−	−	(+)	+	(+)	−	(+)	(+)	(−)	(−)
bck	(−)	(−)	(−)	(−)	(+)	(+)	(−)	(−)	(−)	(+)	(+)	(−)	(−)	(−)	(+)	(−)	(−)	+	−
tns	+	−	+	−	+	−	+	−	(+)	+	−	(+)	(−)	(−)	(−)	(−)	(−)	(−)	(−)
vcd	(−)	(+)	(−)	(+)	(−)	(+)	(−)	(+)	(−)	(−)	(+)	(−)	(+)	(+)	(+)	(+)	(+)	(+)	(+)
str	(−)	(−)	(−)	(−)	(−)	(−)	(+)	(−)	−	(+)	(+)	+	(−)	(−)	(−)	(−)	(−)	(−)	(−)

Table 3

4.2. Changes

4.2.1. During this period, the voiced bilabial spirant β became the voiced labio-dental spirant *v*. Thus:

$$(16_3)\ \begin{pmatrix} -\text{son} \\ +\text{cnt} \\ -\text{cor} \end{pmatrix} > [+\text{str}]$$

This is a generalization of Gmc synchronic rule (16) as well as its revised versions, (16_1) and (16_2).

4.2.2. A nasal, when preceded by a vowel and followed by *f*, *θ*, x, or *s*, disappeared by lengthening and nasalizing the preceding vowel, as in:

OHG *gans*≈OFris, OE *gōs*, 'goose'; Goth *fimf*≈OS, OE *fīf*, 'five'; Goth *munþs* ≈ OS, OFris, OE *mūþ*, 'mouth'.

Thus:

$$(22)\ \begin{bmatrix} +\text{voc} \\ -\text{cns} \end{bmatrix} > \begin{bmatrix} +\text{nsl} \\ +\text{tns} \end{bmatrix} / \text{——}\ [+\text{nsl}] \begin{pmatrix} -\text{son} \\ +\text{cnt} \\ +\text{tns} \end{pmatrix}$$

$$(23)\ \begin{bmatrix} -\text{voc} \\ +\text{nsl} \end{bmatrix} > \emptyset / \begin{bmatrix} +\text{voc} \\ -\text{cns} \end{bmatrix} \text{——} \begin{pmatrix} -\text{son} \\ +\text{cnt} \\ +\text{tns} \end{pmatrix}$$

A similar change had occurred during the period IE—Gmc when, however, the vowel had to be either high or low (*i, a, u*) and the fricative following the nasal had to be *x*. In other words, the set of rules (22)-(23) is a generalized repetition of an earlier set of rules. As is evident from the examples given above, the nasalized vowels soon lost their nasality.[10]

4. 2. 3. *lθ*>*lð*>*ld*, as in:

Goth *balþaba*≈OE *b(e)ald*, 'bold'; Goth *gulþ* (<Gmc **ɣulþa(n)* <IE **ĝhltom*) ≈ OE *gold*, 'gold'; Goth *wilþeis*≈OE *wilde*, 'wild'.

Thus:

$$(13_4)\ \begin{pmatrix} -\text{son} \\ +\text{cnt} \\ +\text{cor} \\ -\text{str} \end{pmatrix} > \begin{bmatrix} -\text{cnt} \\ -\text{tns} \end{bmatrix} / \begin{pmatrix} +\text{voc} \\ +\text{cns} \\ +\text{cnt} \end{pmatrix} \text{——}$$

Note that this is another version of the last rule of Grimm's law.

4. 2. 4. Also *θl*>*dl* if preceded by a long vowel, as in:

Goth *nēþla*, OS *nāðla*≈WS *nǣdl*, 'needle'.[11]

If preceded by a short vowel, *θl*>*tl* in WS, as in:

Gmc *seþla*≈WS *setl*, 'seat'.[11]

Thus:

$$(13_5)\ \begin{pmatrix} -\text{son} \\ +\text{cnt} \\ +\text{cor} \\ -\text{str} \end{pmatrix} > \begin{bmatrix} -\text{cnt} \\ \alpha\ \text{tns} \end{bmatrix} / \begin{pmatrix} +\text{voc} \\ -\text{cns} \\ -\alpha\ \text{tns} \end{pmatrix} \text{——} \begin{pmatrix} +\text{voc} \\ +\text{cns} \\ +\text{cnt} \end{pmatrix}$$

This is another version of (13_4), which is itself a version of the last rule of Grimm's law.

4. 2. 5. *p, t,* or *k,* followed by *l* or *r*, was geminated, and if the vowel or the diphthong before this geminated stop was long, it was shortened, as in:

OE *blǣdre, hwītra, dēopra, bet(e)ra* (Goth *batiza*)>*blæddre, hwittra, deoppra, bettra*, 'bladder, whiter, deeper, better'.

Thus:

$$(20_1)\ \varnothing > \begin{pmatrix} -\text{cnt} \\ +\text{tns} \\ \alpha\ \text{F} \end{pmatrix} / \text{V} \begin{pmatrix} -\text{cnt} \\ +\text{tns} \\ \alpha\ \text{F} \end{pmatrix} \text{——} \begin{bmatrix} +\text{voc} \\ +\text{cns} \end{bmatrix}$$

Note that this is identical with the rule (20_1) in 3. 2. 5. To this rule add the following to shorten the vowel before the geminated stop:

$$(24)\ \begin{bmatrix} +\text{voc} \\ -\text{cns} \end{bmatrix} > [-\text{tns}] / \text{——} \left(\begin{bmatrix} +\text{voc} \\ -\text{cns} \end{bmatrix}\right) \begin{bmatrix} \text{C} \\ \alpha\ \text{F} \end{bmatrix} \begin{bmatrix} \text{C} \\ \alpha\ \text{F} \end{bmatrix}$$

10 The fact that these vowels had been nasalized is evident in Anglo-Frisian where *ã* became *ō*, as in: Gmc **braŋxtō*>**brãxto* (>Goth *brāhta*)≈OFris *brōhte*> *brohte*, OE *brōhte*, 'brought'. If not nasalized, Gmc *ā* normally developed to *ǣ*, as in OHG *tāt, sāt, rātan*≈OE *dǣd, sǣd, rǣdan*, 'deed, seed, read'.

11 This change occurred only in West Saxon. Cf., e.g., Anglian *nēþl, seþel* or *sedl.*

2. 4. 6. A double consonant adjacent to another consonant or in final position became single, as in:

OE **wendide>*wendde>wende,* 'turned'; **fullide>*fyllde>fylde,* 'filled'; **send-de>sende,* 'sent'; **rest-te>reste,* 'rested'; *—man(n),* 'man'; *bed(d),* 'bed'; *feor(r),* 'far'.

Thus:

$$(25)\ \begin{bmatrix} C \\ \alpha F \end{bmatrix} > \emptyset \ / \left\{ \begin{matrix} C\begin{bmatrix} C \\ \alpha F \end{bmatrix} — \\ \begin{bmatrix} C \\ \alpha F \end{bmatrix} — \begin{Bmatrix} C \\ \# \end{Bmatrix} \end{matrix} \right\}$$

4. 2. 7. Metathesis

4. 2. 7. 1. *r* and the succeeding short vowel often changed their positions with each other when followed either by *n*, *s*+consonant, or the word-final *s*, as in:

Goth *razn,* OIsl *rann*≈OE *ærn,* 'house'; Goth, OHG, OS *brinnan*≈WS *birnan* (Anglian *biornan, beornan*), 'burn'; Goth, OIsl, OHG, OS *gras*≈OE *gærs* or *græs,* 'grass'; OIsl, OHG *hross*≈OE *hors,* 'horse'.

Thus:

$$(26)\ \underset{1}{\begin{pmatrix} +voc \\ +cns \\ -cnt \end{pmatrix}} \underset{2}{\begin{pmatrix} +voc \\ -cns \\ -tns \end{pmatrix}} \overset{(op)}{>} 2-1 / — \left\{ \begin{matrix} \begin{bmatrix} +nsl \\ +cor \end{bmatrix} \\ \begin{pmatrix} -son \\ +cor \\ +str \end{pmatrix} \begin{Bmatrix} \# \\ C \end{Bmatrix} \end{matrix} \right\}$$

4. 2. 7. 2. In WS, *sk* and *sp* were also often metathesized:

fiscas≈*fixas,* 'fishes'; *āscian*≈*āxian,* 'ask'; *wæsp*≈*wæps,* 'wasp'.

Thus:

$$(27)\ \underset{1}{\begin{pmatrix} -son \\ +cor \\ +str \end{pmatrix}} \underset{2}{\begin{pmatrix} -cnt \\ -cor \\ +tns \end{pmatrix}} \overset{(op)}{>} 2-1$$

4. 2. 7. 3. In an unaccented syllable, a voiceless spirant and *l* were also metathesized:

OS *rādislo* (ModHG *Rätsel*)≈OE *rædels* 'riddle'.

Thus:

$$(28)\ \underset{1}{\begin{pmatrix} -son \\ +cnt \\ +tns \end{pmatrix}} \underset{2}{\begin{pmatrix} +voc \\ +cns \\ +cnt \end{pmatrix}} > 2-1 / \begin{bmatrix} \overline{\text{unaccented}} \\ \text{syllable} \end{bmatrix}$$

4. 2. 8. Palatalization and Assibilation

4. 2. 8. 1. *sk>sx>*š in initial position,[12] as in:

OHG *scal, scolta, skīnan, scouwōn, scuoh* (*uo*<*ō*)≈late OE *sċeal, sċ(e)olde, sċīn-*

an, sċēawian, sċ(e)ōh, 'shall' should, shine, show'. When there is a front vowel immediately preceding *sk*, this *sk* became *š*, as in: *æsċ*, 'ash'; *disċ*, 'dish'; *flæsċ*, 'flesh'; *fisċes*, 'fishes'; *wȳsċan*, 'wish'; *wæsċen*, 'washed' (p. p.).

When there is no immediately preceding back vowel, and if the following vowel is front, *sk* became *š*, as in *þersċe*, 'I thresh' (but not *āscian* > *[a:šian], but [a:skian]). Thus:

$$(29)\ \begin{pmatrix} -\text{son} \\ +\text{cor} \\ +\text{str} \end{pmatrix}\begin{pmatrix} -\text{cnt} \\ -\text{ant} \\ +\text{tns} \end{pmatrix} > \begin{pmatrix} -\text{son} \\ +\text{cnt} \\ +\text{cor} \\ -\text{ant} \end{pmatrix} / \left\{ \begin{array}{l} \left\{ \begin{pmatrix} \overset{\#}{} \\ \text{V} \\ -\text{bck} \end{pmatrix} \right\} \text{——} \\ \left\{ \begin{pmatrix} \text{V} \\ -\text{bck} \end{pmatrix} \right\} \text{——} \begin{pmatrix} \text{V} \\ -\text{bck} \end{pmatrix} \end{array} \right\}$$
$$\text{C}$$

4. 2. 8. 2. Before a front vowel, the initial *k* and *ɣ* were fronted and became *č* and *y*, respectively, e. g.:

OHG *gart, gelo, geben*≈OE ġeard,[13] *ġeolu, ġ(i)efan*, 'yard, yellow, give': —OHG, OS *kinni*≈OE *ċin*, 'chin'; OHG *kiosan, kiuwan, kāsi, kalt*≈OE *ċēosan, ċēowan, ċēse*, WS *ċeald*, 'choose, chew, cheese, cold'.

Also medially, *ɣ*>*y*, *k*>*č*, *kk*>*čč*, *gg*>*jǰ*, *ŋk*>*ñč*, and *ŋg*>*ñǰ* before *i*, *ī*, or *y*, as in:

WGmc **burgi* (dat. sg.)>OE *byrġ* (often spelled *byriġ*), 'city';

WGmc **baugian*>OE *bieġan*, 'bend'.

WGmc **bisōkjan*>OE *besēċan*, 'beseech'; WGmc **bōci*(dat. sg.)>OE *bēċ*, 'of a book'.

WGmc **wikkjōn*>OE *wiċċe*, 'witch'.

WGmc **hruggian* >OE *hrycg*, 'ridge'.

WGmc **baŋkjō*> OE *benċ* 'bench'

WGmc **saŋgjan*>OE *seŋġan*, 'singe'.

When preceded by *i* or *ī*, *k* became *č*, as in *iċ*, 'I'; *dīċ*, 'ditch'.

Between front vowels, *ɣ*>*y*: *dæġes, dæġe*, 'day' (gen., dat. sg.; cf. pl. *dagas, daga, dagum*). Thus:

$$(30)\ \begin{bmatrix} +\text{cns} \\ <-\text{cnt}> \end{bmatrix}\ ([+\text{cns}])>[-\text{bck}]\ ([-\text{bck}])/ \left\{ \begin{array}{l} \text{——} \begin{pmatrix} \text{V} \\ -\text{bck} \end{pmatrix} \\ < \begin{pmatrix} \text{V} \\ -\text{bck} \\ +\text{high} \end{pmatrix} \text{——} > \end{array} \right\}$$

---

12 In WS, the palatal character of *sc* (=*š*) was frequently indicated by the insertion of an *e* when the following vowel was back.

13 **gard*>**gærd*>**geard*>*ġeard*

$$(31)\ \begin{pmatrix} -\text{nsl} \\ -\text{cor} \\ -\text{bck} \\ -\text{tns} \end{pmatrix} > \begin{pmatrix} -\text{cns} \\ +\text{son} \\ -\text{str} \end{pmatrix} / \text{V} \text{ —— } \begin{Bmatrix} \text{V} \\ \# \end{Bmatrix}$$

$$(32)\ \begin{pmatrix} +\text{cns} \\ -\text{ant} \\ -\text{bck} \end{pmatrix} > [+\text{cor}]^{14}$$

4.2.9. After *i*-umlaut had been completed, medial *y* after a long syllable ending in a consonant was lost before the year 700: OS *settian*≈OE *settan*, 'set'. Thus:

$$(33)\ \begin{pmatrix} -\text{voc} \\ -\text{cns} \\ -\text{bck} \end{pmatrix} > \varnothing \ / \ \left\{ \begin{matrix} \begin{bmatrix} \text{V} \\ +\text{tns} \end{bmatrix} C_1 \\ \\ \begin{bmatrix} \text{V} \\ -\text{tns} \end{bmatrix} C_2 \end{matrix} \right\} \text{ ——}$$

where C_n =n or more consonants.

4.2.10. Voicing Assimilation

4.2.10.1. *v*>*f*, *r*>*x* in final position, as in: *wīf* 'wife', *stāh* 'went' (cf. *stīgan*, *stigon*). Thus:

$$(34)\ \begin{pmatrix} -\text{son} \\ +\text{cnt} \\ -\text{cor} \end{pmatrix} > [+\text{tns}] \ / \text{ —— } \#$$

4.2.10.2. *d*>*t* before a voiceless consonant, as in *þū bindest*>*þū bintst*, 'thou bindest'. Thus:

$$(35)\ \begin{pmatrix} -\text{cnt} \\ +\text{cor} \\ +\text{ant} \end{pmatrix} > [+\text{tns}\ ] / \text{ —— } \begin{bmatrix} +\text{cns} \\ +\text{tns} \end{bmatrix}$$

4.2.10.3. *f*, *s*, *θ*>*v*, *z*, ð between sonorants, as in:

wulfas 'wolves', *nosu* 'nose', *brōþor* 'brother'; also cf. nom. *wīf* ≈gen. *wīfes* [wi:ves], 'wife'; nom. *ġenōh*≈gen. *ġenōges*, 'enough'.

Thus:

$$(14_1)\ \begin{pmatrix} -\text{son} \\ +\text{cnt} \\ +\text{ant} \end{pmatrix} > [-\text{tns}] / [+\text{son}] \text{ —— } [+\text{son}]$$

Note that in a non-sonorant segment, [−tns]=[+vcd], and that rule (14_1) is a somewhat restricted version of Grassmann's law (see **2.2.2.**).

4.2.11. *xs*>*ks*, as in:

Goth *aúhsa*, OHG, OS *ohso*≈OE *oxa*, 'ox'; Goth *wahsjan*, OHG, OS *wahsan*≈OE *weaxan*, 'wax'.

Thus:

14 Note that /n/ in *nč* or *nǰ* generated by (30) and (31) is $\begin{bmatrix} -\text{ant} \\ -\text{bck} \end{bmatrix}$, i.e., [ñ].

$$(13_6)\ \begin{pmatrix} -\text{son} \\ -\text{cor} \\ -\text{ant} \\ +\text{tns} \end{pmatrix} > [-\text{cnt}]/\text{——}/\text{s}/$$

Note that this is another repetition of the last rule of Grimm's law with a slight modification.

4. 2. 12. Intervocalic *x* or an *x* between a liquid and a vowel was lost about 700, lengthening the preceding vowel or diphthong, as in:

**mearhes>mēares*, 'of a horse'; **wealhas>wēalas*, 'foreigners'; **feorhas>fēores*, 'of a life'; **seolhes>sēoles*, 'of a seal'.

Thus:

$$(22_1)\ \begin{bmatrix} +\text{voc} \\ -\text{cns} \end{bmatrix} > [+\text{tns}]\ /\ \text{——}\ \left(\begin{bmatrix} +\text{voc} \\ -\text{cns} \end{bmatrix}\right)\left(\begin{bmatrix} +\text{voc} \\ +\text{cns} \end{bmatrix}\right)/\text{x}/\begin{bmatrix} +\text{voc} \\ -\text{cns} \end{bmatrix}$$

$$(23_1)\ /\text{x}/ > \emptyset/\ [+\text{voc}]\ \text{——}\ \begin{bmatrix} +\text{voc} \\ -\text{cns} \end{bmatrix}$$

Note the similarity of (22_1)—(23_1) given above and (22)—(23) in **4. 2. 2.** which, as mentioned already, was also a repetition of IE—Gmc diachronic rules.

4. 3. OE Synchronic Rules

Rule (11_1) is applied to give the feature [*α* voice] to the outputs of (13_4) in **4. 2. 3.**, (13_5) in **4. 2. 4.**, (34) in **4. 2. 10. 1.**, (35) in **4. 2. 10. 2.**, and (14_1) in **4. 2. 10. 3.** As for the form of (11_1), see **3. 1.** Note also that this rule is not only a PGmc synchronic rule, but also a WGmc synchronic rule.

4. 4. Old English Consonants

As a result of the series of changes mentioned above, the following Old English consonants have been developed:

	p	b	t	d	č	ǰ	k	g	f	v	θ	ð	s	z	š	x	γ	m	n	ñ	ŋ	l	r	w	y
voc	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	+	+	−	−
cns	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	−	−
son	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)
cnt	−	−	−	−	−	−	−	−	+	+	+	+	+	+	+	+	+	+	+	+	+	+	−	(+)	(+)
ñsl	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	−	−	−	−	−	−	−	−	−	+	+	+	+	(−)	(−)	(−)	(−)
cor	−	−	+	+	+	+	−	−	−	−	+	+	+	+	+	−	−	−	+	+	−	(+)	(+)	(−)	(−)
ant	+	+	+	+	−	−	−	−	+	+	+	+	+	+	−	−	−	+	+	−	−	(+)	(+)	(−)	(−)
bck	(−)	(−)	(−)	(−)	(−)	(−)	(+)	(+)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(+)	(+)	(−)	(−)	(−)	(+)	(−)	(−)	+	−
tns	+	−	+	−	+	−	+	−	+	−	+	−	+	−	(+)	+	−	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)
vcd	(−)	(+)	(−)	(+)	(−)	(+)	(−)	(+)	(−)	(+)	(−)	(+)	(−)	(+)	(−)	(−)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)
str	(−)	(−)	(−)	(−)	(+)	(+)	(−)	(−)	(+)	(+)	−	−	+	+	(+)	(+)	(+)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)

Table 4[15]

15 Of the sounds listed in Table 4, the following sets are in complementary distribution: *f–v*, *θ–ð*, *s–z*, *g–γ*, *n–ñ–ŋ*.

The redundant features put in parentheses in Table 4 can be specified synchronically by the following ordered rules:

(1) Same as PIE, PGmc, and WGmc.

(2) Same as PIE, PGmc, and WGmc.

(3) Same as PIE, PGmc, and WGmc.

(17) Same as PGmc and WGmc.

(8_2) [+cns] ⟶ [−bck]

(A generalization of (8) in PIE and (8_1) in PGmc and WGmc)

($8_{2.2}$) $\begin{pmatrix} +\text{cns} \\ -\text{cor} \\ -\text{ant} \end{pmatrix} \longrightarrow [+\text{bck}]$

(By combining (8_2) and ($8_{2.2}$), the PGmc and WGmc rule (8_1) is restricted.)

(9_1) Same as PGmc and WGmc.

(36) $\begin{pmatrix} -\text{son} \\ +\text{cnt} \\ +\text{cor} \\ -\text{ant} \end{pmatrix} \longrightarrow [+\text{tns}]$

(The only entirely new synchronic rule in OE.)

(11_1) Same as PGmc and WGmc.

(18) Same as PGmc and WGmc.

(16_4) $\left\{ \begin{pmatrix} -\text{son} \\ \alpha\ \text{cnt} \\ -\alpha\ \text{cor} \\ -\text{ant} \end{pmatrix} \begin{pmatrix} -\text{son} \\ +\text{cnt} \\ \alpha\ \text{cor} \\ -\alpha\ \text{ant} \end{pmatrix} \right\} \longrightarrow [+\text{str}]$

(A generalied version of PGmc synchronic rule (16) and (16_2); the latter is also a WGmc synchronic rule. Cf. also the WGmc—OE diachronic rule (16_3) in **4.2.1.**)

5. Summary

5.1. In the course of the development of a language, the same rule is applied over and over again without changing its form or in its generalized or restricted form.

The last rule of Grimm's law (rule (13)) is a striking example of such repetition. It is repeated twice during the period PIE—PGmc, twice during PGmc—WGmc, and three times during WGmc—OE: in total, seven times from PIE to Old English in slightly modified forms. One should note, moreover, that this same rule is still active (with some modifications, of course) in sub-standard dialects of present-day English, as in [tæŋk], [tiŋk] for

thank, think; [dis], [dowz] for *this, those*; etc.

Compensatory lengthening (rules (22), (23) and their modified versions) was also common, and appears many times during the period PIE—Gmc (though not treated in this paper), and twice during the period between WGmc and OE.

Verner's law (rule (14)) is also repeated in the period WGmc—OE with a slight restriction. Also see the repetition of the Germanic synchronic rule (16) as a WGmc—OE diachronic rule.

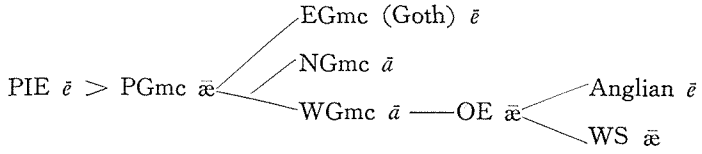
5.2. Total or partial cancellation of some rule by another is also common in the course of language development. An example is a partial cancellation of the last rule of Grimm's law by rule (13′) treated in **2.2.3.** Cancellation of rule is especially common in the history of vowels, though not fully treated here. To give only one example:

IE		Gmc	IE		Gmc
i	$>$	i	$\bar{\imath}$	$>$	$\bar{\imath}$
e	$>$	e	$\bar{e}$	$>$	$\bar{æ}$
$\left.\begin{matrix} a \\ \partial \\ o \end{matrix}\right\}$	$>$	a	$\left.\begin{matrix} \bar{a} \\ \bar{o} \end{matrix}\right\}$	$>$	$\bar{o}$
u	$>$	u	$\bar{u}$	$>$	$\bar{u}$

Thus:

$$(36)\ \begin{pmatrix} +\text{voc} \\ -\text{cns} \\ \alpha\ \text{bck} \\ -\text{high} \\ \beta\ \text{tns} \end{pmatrix} > [-\alpha\beta\ \text{low}]$$

But in later periods, part of this rule was cancelled and re-cancelled as shown in the following chart:



5.3. The sets of synchronic rules to assign redundant features to the segments show no substantial change throughout the period covered by this paper (especially since PGmc).

5.4. Lastly, the description of sound-changes itself is greatly economized by utilizing the convention of generative phonology. Rule (36) in **5.2.** above, which accounts fully for the seemingly unrelated 'unconditioned vowel shifts' in early Gmc, may be sufficient to illustrate the validity of this statement.

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